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EXAMINER

HOANG, QUOC DINH

ART UNIT PAPER NUMBER

2818

DATE MAILED: 02/04/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/898,439

Applicant(s)

NGUYEN ET AL.

Examiner

Quoc D. Hoang

Art Unit

2818

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 26 November 2004.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-16 and 21-38 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 30 and 38 is/are allowed.
- 6) ☒ Claim(s) 1-16, 21-29, 31-34, 37 is/are rejected.
- 7) ☒ Claim(s) 35 and 36 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 11/26/2004 has been entered.

### ***Response to Amendment***

2. Amendment filed on 11/26/2004 has been entered and made of record as Paper No. 1104. In Amendment, claims 30-38 are newly added. Claims 1-16 and 21-38 are pending in the application.

Applicant's remarks have been considered.

### ***Drawings***

3. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the limitation "each said ribbon coil having a width and a thickness" in must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure

number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claim 1, 24-29, 31 and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Qian et al., (US Patent 6,447,636 hereinafter "Qian") in view of Mohn et al., (US Pat 6,401,652 hereinafter "Mohn").

Regarding claims 1, 24-29, 31 and 37, Qian teaches an apparatus for semiconductor processing, the apparatus comprising: a process chamber 101; a solid state RF plasma generator 105 coupled to the process chamber 101 to excite a

process gas and generate a plasma; a controller 140 coupled to the solid state RF plasma generator 105 to pulse the solid state radio frequency plasma generator for each deposited layer, and a stacked cylindrical helical ribbon electrode 102 coupled to an output of the solid state radio frequency plasma generator 105 (col. 3, line 45 through col. 4, line 9, and Figs. 1-4)

Qian does not teach wherein the helical electrode comprises a plurality of flat concentric spirally-connected ribbon-shaped coils, each said coil having a width and a thickness.

However, Mohn teaches a plasma chamber 190, RF plasma generator 180 wherein the helical electrode 100 comprises a plurality of flat concentric spirally-connected ribbon-shaped coils, each said coil having a width  $w$  and a thickness  $t$ , the width being in a dimension facing an adjacent coil, and the thickness being perpendicular to the width, where the width is substantially greater than the thickness (col. 4, lines 29-62, col. 8, lines 30-47, and Figs. 1A-1C and Fig. 3). At the time of the invention was made, it would have been obvious to a person of ordinary skill in the art to combine the flat concentric ribbon coil teaching of Mohn with Qian's plasma chamber, because it would have improved the capacitive coupling RF plasma source power to the plasma as taught by Mohn, column 1, lines 5-10.

Regarding claims 26 and 29, Mohn teaches the coil 300 with various ratio of the thickness to the width may be used (see Fig. 3).

In re Woodruff, 16 USPQ2d 1935, 1937 (Fed. Cir. 1990). See also In re Huang, 40 USPQ2d 1685, 1688 (Fed. Cir. 1996) (claimed ranges of a result effective variable,

which do not overlap the prior art ranges, are unpatentable unless they produce a new and unexpected result which is different in kind and not merely in degree from the results of the prior art). See also *In re Boesch*, 205 USPQ 215 (CCPA) (discovery of optimum value of result effective variable in known process is ordinarily within skill of art) and *In re Aller*, 105 USPQ 233 (CCPA 1955) (selection of optimum ranges within prior art general conditions is obvious). It would have been obvious to one of ordinary skill in the art, at the time the invention was made, to use the optimum ranges for ratio of the thickness to the width in apparatus of Mohn.

6. Claims 2-16, 21-23 and 32-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Qian et al., (US Patent 6,447,636 hereinafter "Qian") in view of Mohn et al., (US Pat 6,401,652 hereinafter "Mohn") as applied to claim 1 above, and further in view of Ishizuka et al (US Pat 5,531,834 hereinafter "Ishizuka").

Qian and Mohn do not disclose wherein the distance between the helical electrode 102 and a workpiece 110 is less than five inches. However, regarding claims 10, 11 and 32, Ishizuka et al., discloses the apparatus is adapted to receive a workpiece W in the chamber 1 and wherein the distance between the coil electrode 13 and the workpiece W is less than five inches (col. 12, lines 34-43 and Fig. 1). At the time of the invention was made, it would have been obvious to a person of ordinary skill in the art to combine the distance between the coil electrode and the workpiece teaching of Ishizuka et al with Qian's plasma chamber, because it would have allowed the plasma to be generated as taught by Ishizuka et al, column 12, lines 13-45.

Regarding claims 2-9, 12-16, 21-23 and 33-34, Qian teach the ribbon coil 102 is external to the process chamber 101; the dielectric wall 103 is a flat plate, tube or concave or projects through a center of the ribbon coil 102, the helical ribbon electrode 102C further comprises a cylindrical helix that forms a plurality of spiral turns in different planes (Fig. 4C)

***Allowable Subject Matter***

7. Claims 30 and 38 are allowed.
8. Claims 35 and 36 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.
9. The following is a statement of reasons for the indication of allowable subject matter: Claim 35 recite, inter alia, the a sheet of dielectric material separates adjacent said spirally-connected ribbon-shaped coils so that, when compressed, the adjacent surfaces of the spirally-connected ribbon-shaped coils do not touch. The art of record does not disclose or anticipate the limitation in combination with other claim element nor would it be obvious to modify the art of record so as to form a device including the above limitation.
10. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

***Conclusion***

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11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Quoc Hoang whose telephone number is (571) 272-1780. The examiner can normally be reached on Monday-Friday from 8.00 AM to 5.00 PM.

If attempt to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Nelms can be reached on (571) 272-1787. The fax phone numbers of the organization where this application or proceeding is assigned are (703) 872-9306 for regular communications and (703) 872-9306 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-

0956.

  
Quoc Hoang  
Patent examiner/AU 2818.

  
David Nelms  
Supervisory Patent Examiner  
Technology Center 2800